

AMENDMENT UNDER 37 C.F.R. § 1.111

U.S. Application No. 09/867,596

Q61608

REMARKS

The Office Action of March 18, 2003, has been received and its contents carefully considered.

The Examiner has made of record the telephone restriction requirement and applicants' election of the invention of Group I, claims 1-6. The Examiner states that applicants must affirm this election when replying to the Office Action. Applicants hereby affirm this election.

Claims 4-6 have been objected to under 37 C.F.R. § 1.175(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. The Examiner states that claims 4-6, therefore, have not been further treated on the merits.

Applicants have cancelled claims 1 to 6 and have added new claims 21 to 26. The new claims do not contain any improper multiple dependent claims.

Claim 1 has been rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over the Mochida et al article entitled "Carbonization of Pitches-IV".

In addition, claims 1 and 2 have been rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over the Mochida et al article entitled "Carbonization of Aromatic Hydrocarbons-III".

Further, claims 1 and 2 have been rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over JP 07-206416A to Shinichi et al.

Also, claims 1 and 3 have been rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over the *Carbon Black Manual*.

Applicant's submit that Mochida et al-IV, Mochida et al-III, JP'416 and the *Carbon Black Manual* do not disclose or render obvious the presently claimed invention as defined in new claims 21 to 26.

The present invention, as defined in independent claim 21, is directed to a carbon powder having a primary particle size of 100 nm or less and an X-ray crystallite plane spacing C_0 of less than 0.680 nm, and having a boron content in a range of 0.001 to 5% by mass. Claim 21 corresponds to original claim 5 rewritten in independent. The use of boron in a specific amount, as recited in claim 21, enables a high graphitization degree and excellent electrical conductivity to be obtained.

Claims 22 to 24 recite subject matter from claims 2 to 4.

Claim 25 corresponds to original claim 6, but is now dependent on independent claim 25.

Claim 26 is supported by the disclosure at page 15, lines 23 to 25 of the present specification.

The Mochida et al-IV article, the Mochida et al-III article, JP'416 and the *Carbon Black Manual* do not contain any disclosure of a carbon powder that contains boron or has a boron content of 0.001 to 5% by mass.

Accordingly, these references do not anticipate or render obvious the presently claimed invention.

In view of the above, applicants submit that Mochida et al-IV, Mochida et al-III, JP'416 and the *Carbon Black Manual* do not defeat the patentability of the present claims and, therefore, request withdrawal of these rejections.

Claims 1-3 have been rejected under 35 U.S.C. § 103(a) as obvious over JP 62-246813A to Yasuhiro et al taken with JP 2000-273351 to Masaru et al.

Applicants submit that these references do not disclose or suggest the presently claimed invention and, accordingly, request withdrawal of this rejection.

The invention of Yasuhiro et al (JP'813) relates to a method for obtaining a spherical graphite body by adding a boron compound such as boric acid to carbon black and heating the mixture.

It is well known that carbon black cannot be graphitized even by high heat treatment (as described in the present specification at page 3, lines 10-12 and JP'813 page 2, right upper column), and only in particular cases, graphite with a plane spacing value of less than 0.680 nm can be obtained. The present specification states at page 14, lines 8-12,

“If a boric acid which is in general easily available is mixed and heat-treated, instead of using boron carbide as the raw material of boron, enough reduction in the C_0 value cannot be attained by the graphitization, and it is difficult to make the C_0 value of less than 0.680 nm.”

Thus, the C_0 value cannot be satisfactorily lowered by using boric acid.

The boric compounds on which experimental data was obtained in JP'813 are only boric acid and borax. Further, JP'813 is silent on the differences in properties between the product obtained by using boric acid and that obtained by using borax. Accordingly, it cannot be anticipated from the teachings of JP'813 that use of a specific boron compound would contribute to obtaining a product excellent in specific properties, such as graphitization degree and electrical conductivity.

On the other hand, Masaru et al (JP'351) teach a process for producing graphitized carbon black through heat-treating a mixture of carbon black such as acetylene black and a graphitization promoting substance such as boron carbide, boric acid and boron oxide. The Examiner alleges that "[i]t would have been obvious to one of ordinary skill at the time of invention to substitute the boron graphitization promoter of Masaru et al. in the process of Yasuhiro et al. because it provides the same effect."

However, the inter-planer spacing value d_{002} obtained in JP'351 is within the range of 0.3413 to 0.3426 nm, which is, in terms of C_0 value, within the range of 0.6826 to 0.6852 nm. Therefore, it can be concluded that carbon powder having a spacing value C_0 of less than 0.680 nm cannot be produced by the process of JP'351. Accordingly, one of ordinary skill would not have been motivated to substitute the boron graphitization promoter of JP'351 in the process of JP'813 to obtain carbon powder of a spacing value C_0 of less than 0.680 nm.

Moreover, in JP'351, the amount (0.1-10% of B) of graphitization promoting substance is defined as the amount of the substance to be added to carbon black. See JP'351 paragraph [0015] and Example. On the other hand, the amount of boron as described in the present invention, as set forth in claim 21, is defined as the amount of boron in carbon powder as final product, as disclosed in the present specification at page 13, lines 7-16, which distinguishes the present invention from JP'351.

JP'351 neither describes nor suggests the boron content in the final product, while it is clear that in the present invention the boron content is determined with respect to carbon powder

as final product through analysis using ICP Emission Spectroscopy after pre-treatment. See the present specification, page 29, lines 2-4.

In view of the above, applicants submit that claims 21 to 26 are patentable over JP'813 and JP'351 and, accordingly, request withdrawal of this rejection.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 1-6 are canceled.

Claims 21-26 are added as new claims.